

Universal childhood virus is inherited in DNA

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By [New Scientist staff and Reuters](#)

A virus that causes a universal childhood infection is often passed from parent to child at birth, not in the blood but in the DNA, according to a new study.

Researchers found that most babies infected with the HHV-6 virus, which causes roseola, had the virus integrated into their chromosomes. Not only that, but either the father or mother also had the virus in the chromosomes, suggesting it was a germline transmission – passed on in egg or sperm.

“This is really a unique mechanism for congenital infections,” said Caroline Breese Hall, a pediatrician at the University of Rochester Medical Center in New York who led the study.

Her team is now investigating what this means for the children.

“If you have a chromosome that has got a virus integrated into it, what does it mean? What does it do? Can it activate again? Can it start spewing out virus and cause problems? Can you get an immune response to it?” Hall said.

Fever and rash

The questions are critical because nearly everybody is infected with HHV-6. It is a herpes virus that causes roseola – an infection marked by high fever and the usual vague virus symptoms that may include respiratory or stomach problems.

About 20% of children also have a characteristic sudden rash that appears just as the fever breaks.

Hall’s team studied 250 infants, 85 with HHV-6. Of them, 43 were born with the virus and 42 were infected later.

Most of the babies born with the virus – a congenital infection – had the virus in the chromosome. Hall said the assumption had been that the virus somehow crossed the placenta from mother to child, but in 86% of cases, it was inherited directly in the genetic material.

Just 14% were infected across the placenta.

Tests showed either the mother or the father – but not both – also had HHV-6 in the chromosomes.

“Because we know a parent already had the virus in the chromosome, we know that it didn’t spontaneously wiggle its way in once the baby got it,” Hall said.

Woven into DNA

There were several spots where the virus integrated into the DNA, but usually right at the end of the chromosome, where a [key structure called the telomere](#) is found. Telomeres protect the chromosome and are involved in aging and immune response.

The virus is everywhere in people who inherit it, Hall said. “In your hair, your nails, your skin, your blood, and at very high titers (levels),” she said.

The babies infected this way did not appear ill but Hall wants to follow them as they grow up to see if they develop normally. They all had antibodies to HHV-6, which is evidence of an immune reaction of some sort.

There is no drug licensed to treat HHV-6 infection.

Other viruses are known to integrate into the DNA and pass on from parent to child, but these so-called human endogenous retroviruses have never been known to cause symptoms or activate an immune response.

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